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TABLE OF CONTENTS.

PAGE.

EDITORIAL ARTICLES:—Western American Oaks.—The Lynn Public Forest..... 605
The California White Oak. (With illustration.)..... 606
The Autumn Flora of the Lake Michigan Pine Barrens.—II....*E. J. Hill.* 606
Private Grounds and Enclosures in Cities and Towns.—II., *Sylvester Baxter.* 607

PLANT NOTES:—Vanda Batemanni and Vanda Lindeni in Their Native Country, *Auguste Linden.* 608

NEW OR LITTLE KNOWN PLANTS:—Streptocarpus Dunnii. (With figure.).....*W.* 608

FOREIGN CORRESPONDENCE:—London Letter.....*W. Watson.* 610

CULTURAL DEPARTMENT:—Rose Notes.....*W. H. Taplin.* 610
The Calochortus in Cultivation.....*Carl Purdy.* 611
Our Twenty "Best" Apples .....*T. H. Hoskins.* 612
The Grape Market.....*E. Williams.* 613
Cattleya Percivaliana alba.....*A. Dimmock.* 613

THE FOREST:—Value of Mountain Forests.....*J. B. Harrison.* 613

CORRESPONDENCE:—A Good Tree for the South.....*George T. King.* 614
From a Foreign Creditor.....*Kelway & Son.* 614
A Weeping Maple.....*Q.* 614

THE KANSAS HORTICULTURAL SOCIETY:—Orchards on the Prairies.....*S. C. M.* 615

NOTES..... 616

ILLUSTRATIONS:—Streptocarpus Dunnii, half natural size, Fig. 81 609
A California White Oak (*Quercus lobata*)..... 611

Western American Oaks.

THE flora of western North America is rich in Oaks. They form a widely scattered group of trees and shrubs with many peculiar forms, very dissimilar, except in the case of a few of the species, to the Oaks of the Atlantic side of the continent, where the genus is also largely represented. The western American Oaks, especially the species which inhabit the region bordering Mexico, are certainly the most difficult of all our trees to distinguish specifically. Such characters as may be usually depended on to distinguish one of our eastern Oaks from another are not readily found in these western plants. Some of these species, if they are regarded in any broad sense, vary with latitude or soil or elevation in the most remarkable manner, and the same plant sometimes furnishes within the area of a few acres sufficient distinct forms for half a dozen herbarium species, as Engelmann noticed in the case of the Rocky Mountain Scrub Oak, growing on the upper slopes of the Grand Cañon of the Arkansas. There are species which are represented in one valley by stately trees, while in another, a few miles off, they are shrubs, producing their fruit on stems rising perhaps to a height of a foot only from the ground. The leaves on one individual of a species may be all entire, and on another, growing under what appear to be precisely similar conditions, they may be conspicuously spinosely-serrate, or the two forms may be found mingled on the same plant. The fruit of different individuals varies greatly, too, in size and often in shape, and the botanist who studies these plants in the herbarium only will find abundant material to multiply at least by ten the number of the species which are now admitted by the best field observers.

The more these Oaks are studied the more difficult becomes the proper limitation of the species. But this is true of nearly all genera in which many forms have been developed, that is, in which the tendency to seminal variation is strong, as is the case, for example, with nearly all plants of the Rose family. All genera are difficult if one takes the trouble to study them, is the true remark of a distinguished botanist who has devoted thirty years of his life to the critical study of the species of a single genus. That is to say, the difficulty of defining species increases in proportion to the extent of our knowledge, and the more we study plants the more we realize the impossibility of placing artificial limits to the groups of individuals which botanists call species. The study of every large genus presents difficulties enough, if the attempt is made to learn everything there is to learn about it; and although it is getting to be the fashion to think that the labors of the systematic botanist are nearly over, it is probably true that there is not a single large genus of plants which is thoroughly known or understood in all its aspects, and that instead of knowing the plants of the world, we are only beginning to get ready to study them. This is certainly true of the Oaks of western America, although it is nearly a hundred years since Humboldt discovered in Mexico one of the species which is now known to grow within the present limits of the United States; and although from Humboldt's day to this the botanists who have dealt with the plants of western America have studied the Oaks more or less intelligently.

Thomas Nuttall, one of the best of observers, who saw many of them growing in his transcontinental journeys, published figures of a number of the species fifty years ago in his continuation of Michaux's "North American Sylva," and there are admirable figures of some of the southern species which extend into our territory from Mexico in the work of the Danish botanist Liebmann on the Oaks of Central America, published long after his death by his compatriot, Œrsted. Dr. Albert Kellogg studied the California Oaks for years and drew figures of many of the species. Engelmann studied them long and patiently with all the zeal, acumen and sound judgment which he brought to the investigation of any particularly difficult group of plants. The conclusions which he reached with regard to the California Oaks are worthy of the most careful consideration, although he did not have the advantage of studying these trees in the field until after his mind had been pretty well made up about them, and although there are several species described by him which he never saw outside of herbaria. When the chaotic condition of our knowledge of the American Oaks, Pines, Firs and Junipers when Engelmann began to study them, and the light which has been thrown upon them by his studies, are remembered, too much, certainly, cannot be said in praise of his labors in this field.

The latest study of the California Oaks has been made by Professor Edward L. Greene, of the University of California. It originated in the desire of a liberal patron of science in California, Mr. James M. McDonald, to publish the drawings of the Oaks left by Dr. Kellogg. They were reproduced eighteen months ago, Mr. Greene supplying the text, with descriptions of some new species and many critical and valuable notes. The summer of last year was then devoted by Mr. Greene to studying western American Oaks in many of the regions where these trees occur, and now he has brought out, through the liberality of Mr. McDonald, a second paper on the subject, with descriptions and figures of several additional species and varieties which the author proposes, after careful examinations made upon living plants.

It is not our purpose to criticise the conclusions reached by Mr. Greene. He has had better opportunities than any of his predecessors to observe these plants growing over wide ranges of country, and therefore under dissimilar conditions with regard to soil, climate and exposure, and whether his ideas of the specific rank of some of the western Oaks are generally accepted or not, the value of his investigation cannot be denied. A complete knowledge of these trees, or even an approximately complete knowledge of them, such as exists with regard to our eastern Oaks, the result of two centuries of investigation, will only be reached by the study of the trees in the field by a large

number of students approaching the subject from different points of view. The accumulated knowledge thus gained will give the best idea that can be obtained of this group of trees and of the limitation of the species. Botanists, however, will always differ in their conception of species, and in the case of the California Oaks the varieties of one will be species for another, or what one author considers a species another will regard as only a variety or as a natural hybrid. Information of this character, unsatisfactory, doubtless, as it may appear to those persons who believe that it is the duty of the naturalist to find unalterable characters for every species, will only be reached through field observations, and the more people who study our trees in the field, as Professor Greene is studying them in California, the more accurate and satisfactory will be our knowledge of them.

These two papers upon our western Oaks must be ranked among the important contributions which have been made toward an understanding of North American trees.*

Rather more than a year ago we gave some account of the forest of the city of Lynn, an area of wooded land once held in common by the proprietors of the city for the fuel and timber they needed, and now restored to the use of the public. It is altogether the largest area which has been dedicated to park purposes in New England. The territory remains in nearly its original state, being a region of rocky hills with bold ledges and deep glens, through which rapid brooks find their way. From an article in the *Boston Herald* it appears that the commissioners who have been charged with the administration of this work have acted with wisdom, making several miles of substantial roads and laying convenient footpaths to the places of the greatest interest. The most important change has been in the completion of a new water-basin known as Glen Lewis and Walden Ponds. A substantial stone dam divides the basin into two sections, the upper level of which goes by the former name and the lower by the latter. The two form a long body of water of varying width, with branches extending between the hills, whose slopes are covered with healthy young Oaks and masses of White Pine and Hemlock. Looking up and down the valley from certain points this basin has the effect of a large river, and glimpses of it obtained from the neighboring hills are remarkably beautiful, while from some of the more elevated points prospects of great extent and varied interest stretch away on every hand. Of course it will be the aim of the management to preserve as far as possible the original features and natural charm of the whole region. It can be maintained more cheaply on these lines, and it will be much more satisfactory than if an attempt were made to subdue its wildness into pastoral or park-like scenery or to transform it into something artificial and formal. Some portions of it are to be held as a productive forest, and the success of this experiment will be watched with attention.

The important fact, however, is that the city of Lynn has led the way in establishing a public forest, and has thus set an example for other cities which have similar opportunities. It is true that there are few such regions of wild forest-land adjacent to bustling cities; but in several towns of the middle and New England states there are wooded gorges through which happy brooks are flowing, and tracts of broken land, and wherever these natural features exist it would seem the part of wisdom to take possession of them before they are obliterated by "improvements" of some sort. Some of the new cities which are growing so rapidly in the south will soon be lamenting over lost opportunities after the neighboring forests have quite disappeared. In the north-west, too, young cities are growing into an exact resemblance of older towns in the east without a thought of preserving the primeval forest which they are displacing, and yet a thousand acres of Douglas Fir and Giant Thuya would make a forest-park so characteristic and so noble that, fifty years hence, it would command the admiration of the world.

The California White Oak.

The largest of the California Oaks, one of the largest of the genus and the most graceful of all the species which inhabit North America, is the White Oak of the California valleys (*Quercus lobata*), of which a portrait appears on page 611.

The California White Oak attains sometimes a height of one hundred feet, with an enormous trunk seven or eight feet through, separating often near the ground into several main branches, whose ultimate divisions are long, slender and pendulous, the whole forming a broad head of surprising grace and beauty. The aspect of the tree seen from a little distance is rather that of the best type of the New England Elm than of an Oak, and more than any other tree this White Oak gave the peculiar park-like appearance to the valleys of central California, which so delighted travelers before these valleys were turned into Wheat fields.

The great size and the graceful habit of *Quercus lobata* are not the only beauties of this tree. The leaves which clothe the slender branches are large, bright colored and deeply lobed. The acorns, which are quite unlike those of any of our eastern Oaks, are slender, usually pointed, and sometimes two and a half inches long, with hemispherical tuberculated cups.

The wood of this tree is brittle, like that of all the California Oaks, and is practically worthless except for fuel. Economists deplore the poor quality of the timber produced by the California Oaks. There is, however, another side to this question, and California is, on the whole, a gainer in several thousand noble trees, which, had they produced timber as valuable as that of eastern White Oaks, would long ago have been converted into wine casks, and the California valleys would have lost forever their greatest charm.

We are not aware whether the attempt has ever been made in California to cultivate *Quercus lobata* as an ornamental tree. Outside of the state none of the California Oaks have ever succeeded in any marked degree, although various attempts have been made in different parts of Europe to grow them. They need, probably, the long, hot, dry summers which European climates do not afford. They might, however, be expected to succeed in Australia or in northern Africa, and should this prove true there could be no more splendid tree for the ornamental plantations of these countries than this Oak.

Our illustration is made from a photograph, communicated to us by Mr. William Alvord, of San Francisco, of a very fine specimen growing on General John Bidwell's farm in Butte County, one of the wonders of California's agricultural prosperity. This particular tree is remarkable for its great spread of branches, which have a diameter of nearly one hundred and fifty feet, rather than for the size of the trunk, which is only six and a half feet in diameter. The tree is growing on sandy, alluvial soil, and is honored with the name of "Sir Joseph Hooker," who visited and admired it in 1877 in company with Asa Gray.*

The Autumn Flora of the Lake Michigan Pine Barrens.—II.

The most attractive flowers at this season, however, are the Blue Gentians, seen by thousands throughout the moist grounds of the barrens. Two species of them are recognized in our descriptive botanies, *Gentiana crinita* and *G. serrata*, but they run into each other so imperceptibly and completely that it matters little to which of the two many of the plants are assigned. Those whose leaves are broad and short are apt to have a more deeply fringed corolla, with some other distinctive marks, while those with narrow or linear leaves have the fringe of the corolla short or obsolete. Such will confidently be referred to the types of the respective species, but many that come between will be accepted with hesitation. The floral colors vary from pale to bright blue, the darker shades preponderating particularly with the narrow-leaved plants. When they grow in company with *Solidago Ohioensis* they either share the ground with it or more often form a kind of border to the yellow patches, apparently not succeeding in quite as moist localities as this Golden-rod may select. In similar places, but much less common, *G. Saponaria* and *G.*

* "Illustrations of West American Oaks," from Drawings by the late Albert Kellogg, M.D., the text by Edward L. Greene. Published from funds provided by James M. McDonald, Esq. Part I. San Francisco, 1889.—Part II. 1890.

*A portrait of this tree, made, perhaps, from the same negative, although greatly reduced, was published by Dr. C. C. Parry in an article descriptive of Rancho Chico, which first appeared in the *Overland Monthly* for June, 1888, and was afterward issued separately.

Andrewsii may be found, their corollas bright blue and scarcely opening. Very rarely *G. alba* will be seen, its flowers yellowish white. The last begins to bloom in midsummer and continues till the middle of September, being considerably earlier than any other Gentian here. On the higher ground *G. puberula* is not uncommon, its corolla very dark blue. It is a low plant, not often more than ten or twelve inches high, but succeeding admirably in the sand, and striking its long roots, generally two in number when they start from the base of the stem, deep down into the ground to the distance of two feet or more.

Vying with the Solidagos in contributing yellow flowers the present season (1890) was the shrubby Potentilla (*P. fruticosa*). They were as fully in blossom as in the earlier part of the summer. Though they continue in flower a part of September, their profusion this year was somewhat exceptional, and is doubtless due to a prolonged drought followed by rain the latter part of August, which has stimulated some plants into new activity and made these a conspicuous feature of the flora. Long strips of yellow bordered the wetter ground beside the sloughs, which run quite straight and parallel, sometimes for several miles. They usually grow in situations too wet for Golden-rods; but some that root in mossy bogs, like *S. neglecta* and *S. uliginosa*, are present to increase the effect, lifting above the shrubs their dense panicles of yellow.

A pretty plant of low stature, but looking frankly up at the beholder like a broad, white eye, is our only Parnassia (*P. Caroliniana*). It is very smooth, with a few wide or roundish leaves near the ground, and a smaller sessile leaf midway up its simple, scape-like stem, which bears a single flower at its top. This is peculiar, and always a subject of interest by reason of its crown of abortive filaments mixed with those which are anther-bearing. They are seen abundantly in the damp soil where the grass is not too rank, and often in such close proximity as to nearly cover the ground with white.

Two Orchidaceous plants still linger beyond others of their family, one in its proper season (*Spiranthes ceruna*), the other (*S. gracilis*) past its best. The former grows on bogs or in wet, grassy land, often hidden away beneath the small shrubs. No bouquet of wild flowers gathered where it is found would be deemed complete without a liberal supply of its chaste white flowers to give to the whole a delicious perfume. On account of its odor it has doubtless obtained a common name, especially among children, as the "Wild Tuberose." *S. gracilis* is seen in drier ground amid the overshadowing Pines. In similar localities, with these and with Parnassia, may still be found fair specimens of *Sabbatia angularis*. It has also passed its prime, but is common during the early part of September. It bears an ample number of flowers of a deep rose color, with a greenish star, bordered by a dark red or purple line, at the base of the spreading corolla, making them an unfailing source of attraction in its native wilds as one of our handsomest flowers.

Two species of Coreopsis are now in full bloom, *C. trichosperma* and *C. tripteris*, one or the other found nearly everywhere along the margins of the ponds or in very wet ground, the former the more common. When from six to twelve inches high it bears a flower barely more than half an inch across; but when it reaches a height of four or five feet it branches widely, and is well supplied with large heads that measure two inches from end to end of rays. With us it is a smooth plant, with a stoutish stem furnished with few leaves divided into narrow, almost thread-like segments. With its many flowers having golden yellow rays and a yellow disc, it takes a prominent place in the autumnal flora. *C. tripteris* has a greener stem and leaves of a different pattern. They are quite uniformly divided into three lanceolate segments, and are rather widely spaced on the tall, smooth stems. Its rays are not of so deep a yellow as in the case of *C. trichosperma*, but contrast sharply with the flowers of the disc, dark brown or almost black when they reach maturity, giving to the blossoms a different look.

Where the Coreopsis grows, and in localities not quite so wet, our prettiest Gerardia (*G. purpurea*) is found. Its average height is about a foot, and the open, nearly bell-shaped, rose-purple flowers are large for a small plant, being almost an inch in length, and often nearly as broad as long. The whole plant, though widely branching, is very slender, so that it looks as if its flowers would weigh it down, several of them appearing at the same time. It is exceedingly abundant and occurs throughout the region. The smaller flowered *G. tenuifolia* grows in like situations, but is not so common. Still another small flowered species is not out of bloom in the early fall, but much less common, or even rare. This is *G. Skinneriana*, the smallest of the species here. It has a few short and thread-like leaves, which are far apart on a slender and mostly simple stem hardly a foot high. It likes the moist ground, but also takes to drier places than the other two. Both of these have paler flowers than those of *G. purpurea*, and are very pretty species. In the dry ground may be gathered the large, yellow flowers of *G. pedicularia*. Its foliage is handsome, the leaves being much cut up, and, together with the branching stem and flowers, are thickly covered with a viscid pubescence. The whole plant, except the flowers, frequently takes a purple hue. Were it not for the parasitic habit of the roots of Gerardia, making them difficult to cultivate, they should become most welcome flowers for the garden.

Four kinds of Utricularia may be met with in September. *U. cornuta* is abundant in the wet sand, often rendering the ground yellow with its numerous flowers. The stems are short, from four to ten inches high, each bearing three or four large yellow flowers. They grow in great numbers among the scattered Rushes or in spots bare of other plants in open, sunny places. They delight most in situations where the water has dried away, in the wet sand or mud, and would make a pretty border for the sandy margin of an artificial lake. The minute *U. gibba* is occasionally seen in the shallow water by the edges of the sloughs, its scape bearing one or two small yellow flowers. Still rarer is *U. resupinata*, its one small purple flower seeming to rest crosswise on the end of a scape two to six inches high. It affects about the same condition of growth as *U. cornuta*. *U. purpurea* is a purple flowered species also, but it floats on the surface of the ponds. The stems are long and branching, and covered with little bladders which serve to float it on the water. From these stems a few two or three flowered scapes rise above the water, with blossoms nearly as large as those of *U. cornuta*.

In many places in the driest sands *Monarda punctata* abounds, seemingly regardless of all conditions of moisture as dependent on the weather. Its large yellowish or purplish bracts are its most prominent feature, but, hidden among them or peeping out from their midst, are some dainty flowers—yellow, dotted with purple spots.

Artemisia Canadensis flourishes everywhere in the dry sand. Its flowers are inconspicuous if considered separately, but are very numerous on the wand-like stem and branches. But its finely dissected leaves and strict branching stem thickly covered with them make it, on the whole, a comely plant. It is sometimes hoary with a gray pubescence, but not so much so as some other species, being generally of a lively green, keeping its color well against the frosts when most of the other plants are dead.

Englewood, Chicago. *E. J. Hill.*

Private Grounds and Enclosures in Cities and Towns.—II.

THE requirements of city dwellings in the way of out-door space, such as might be afforded by giving enlightened attention to the subject, are quite different from those of the suburbs. It is probable that the model city of the future will have an open, garden-like character radically in contrast with the closely built cities of to-day, and there are already indications that our cities will gradually be rebuilt in conformity with that idea. Every one who visits certain portions of Spain, or of Spanish America, is charmed with the feature known as the "Pátio," the interior court of a dwelling-house, surrounded with arcaded corridors, a plashing fountain in the centre, perhaps planted with Orange-trees and Oleanders, and with the corridors bordered by rows of brilliant flowering plants in graceful pots or vases, while the air is musical with the song of numerous birds in their cages. This, like the "close," is an out-door apartment.

In most of our northern cities the climatic conditions are such that this inner court feature is impracticable. Yet a modification of it is something that should become a feature as characteristic as the pátio is to the houses of Mexico or Andalusia. That is, instead of having the interior court a feature of a single house, let it be common to a neighborhood of houses. Let the space now devoted to unsightly back-yards and alley-ways in the quadrangle formed by the four streets of the usual city block be converted into an enclosed garden space, where children may romp in safety, free from the influences and dangers of the street, and where the open air may be enjoyed in common by all the surrounding households. It is possible to make a delightful garden of such a place.

Successful efforts have already been made in this direction. In one of the new districts of Boston a few years ago, in the building of blocks of houses on the four streets forming a

quadrangle, a turfed enclosure and playground was laid out in the centre, and it has proved a very satisfactory and attractive feature. This idea lends itself admirably to the construction of apartment houses in a neighborhood. The chief hindrance to its general adoption lies in the indisposition of builders toward acting co-operatively, even where their common advantage is concerned. But as the benefits of the plan become evident this obstacle will probably be overcome, and we may look to see at no distant future the new additions to our cities and the newly planned cities of this country so arranged that their dwellings shall enclose common pleasure-grounds for each block ample in space and beautiful in design. The maintenance of these in attractive shape would be as much a matter of pride with the residents as the proper care of their grounds is with the residents of an enlightened suburban or rural neighborhood.

The desirability of this plan in its application to a neighborhood of working-people is illustrated in an interesting experiment just tried by the city of Liverpool in the erection of houses for that purpose. An unsightly tract, covered with wretched hovels, was condemned by the city under the act of Parliament authorizing municipalities to take such action, turning out 1,300 people. Under special plans by Mr. Clement Dunscombe, who was afterward awarded a gold medal at the International Health Exhibition for this work, a quadrangle of pleasant five-story buildings was established with room for 600 or 700 people. The open space is devoted to a playground and garden, with five arched passage-ways from the streets. The garden is adorned with a fountain, and there are walks and roads of gravel. Should this plan be generally adopted by cities there would be no necessity of incurring large expenditures for demolishing buildings in tenement neighborhoods to create small parks; the needed breathing places would be supplied by these enclosures, and the whole work would be a profitable transaction for the city, for the Liverpool enterprise yields the municipal treasury a return of four per cent. on the investment, with the rates for rents placed at a remarkably low figure.

Another enterprise in Boston, or rather in the adjacent town of Brookline, is worthy of mention as indicating the tendency to an open character in city construction. Out on the beautiful new Beacon Street improvement, near Chestnut Hill, where the suburban neighborhood is rapidly assuming an urban character, expensive blocks of houses have been built on the "terrace" plan, after an artistic design. These houses not only have small individual gardens, but they face a large and handsome garden, the use of which is free to the tenants or purchasers for tennis, croquet and general recreation. The residents in these houses are also furnished daily, at reduced rates, with fresh vegetables and pure milk from a farm belonging to their builder.

Eventually our cities can perhaps be rid entirely of the drawbacks of their closely built character, which, with the attendant confusion, noise and confinement, is responsible for much of the disease and discomfort of urban populations. They will then be transformed into expanses of house-enclosed garden-spaces, which, with the establishment of large and numerous public parks, will combine upon the same area the main advantages of both city and country life.

Boston. *Sylvester Baxter.*

Plant Notes.

Vanda Batemanni and Vanda Lindeni in Their Native Country.

THE thirty-five or forty species of the splendid genus Vanda are widely scattered in tropical Asia from the Malay Archipelago to the base of the Himalaya Mountains, where only Dendrobiums and some of the genera peculiar to a more temperate climate occur. These favored regions of southern Asia are especially noteworthy on account of the abundance and splendor of the Orchids which they contain.

The numerous groups of islands which compose the Malay Archipelago offer a vast field to botanical explorers. Unfortunately, many of the islands are surrounded by coral reefs which make landing difficult. At the time I visited this Archipelago I tried to navigate as near as possible to the coral reefs, endeavoring to explore the flora of each island with the aid of my field-glass, especially when the island was so small as to make the landing undesirable, the landing on these islands, as I have said, being always exceedingly difficult.

It was in this way that I first saw *Vanda Batemanni*, growing almost at the sea-level, when the tide was in, upon rocks rising from the water. In the little island where I found this plant for the first time it existed in great quantities and in handsome straight specimens. The best were those which grew against shrubs or on isolated rocks. I saw several which were more than six feet high bearing on each side of their stems from four to eight floral spikes. I noticed many other Orchids on this island. The plants, with one exception, however, were not in flower, and I could not determine the genus at the time. The exception, however, made a great impression on me. It proved to be *Bulbophyllum grandiflorum*. The plant covered entirely a little tree with its flowers, producing at a little distance a most remarkable effect.

Vanda Lindeni, which I discovered in one of the islands of this region, grows in an entirely different way. It is found almost always on the dead branches of large trees, on the borders of small forests, or on fallen trees near the banks of rivers or brooks, but always at a certain distance from the ground. This remarkable species appears in clusters, with from fifty to two hundred stems, and sometimes with even more. It is a difficult matter to collect the plants, as the red ants, one of the scourges of that beautiful country, always make use of them to establish their nests in. The natives are very much afraid of their bite, which produces an eruption which lasts for several days. They are, therefore, exceedingly unwilling to climb the trees where the plants are growing for the purpose of collecting them. So I was obliged to employ another method for gathering the plants. I fastened several bamboos end to end and fixed a hook at the end of the long pole thus obtained. In this way I was able to pull down a few small clusters. As soon as the plants fell we dragged them at once to the water and gave them a good bath in order to rid them of the terrible guests with which they were often covered.

Vanda Lindeni is extremely prolific. I have seen clusters of stems upon which there were more than a thousand flower-spikes, most of them with from twenty to twenty-five flowers. Unfortunately, the specimens of this marvelous Orchid which I was able to bring living to Europe only give a very incomplete idea of what this plant is in its native home, both as to the size of the specimens and the abundance of the flowers.—*Auguste Linden in Le Journal des Orchidées.*

New or Little Known Plants.

Streptocarpus Dunnii.*

THIS is one of the most remarkable of the many remarkable plants of Africa. It was introduced to Kew in 1884 by means of seeds sent from the Transvaal, on the mountains of which, near a place called Spitzkop, it is said to be abundant. The seeds soon germinated, and the development of the plants was watched with increasing interest as the solitary leaf, of which each consisted, gradually assumed extraordinary proportions. Its ultimate size was over three feet in length by sixteen inches in breadth, the petiole as thick as, and no longer than, a man's thumb, whilst the blade extended along the ground like a large Rhubarb leaf. The principal nerves were very thick and fleshy, and the under side was thickly clothed with a reddish tomentum, the upper surface being also hairy, and gray-green in color. The effect produced by about a hundred plants of this Streptocarpus, which formed a border round a large bed of succulent plants in one of the large houses at Kew, was particularly striking. When, however, the plants flowered, their interest and attractions were considerably increased. From the base of each leaf, and extending some few inches up the midrib, there was a row of scapes packed close together and rising erect to the height of a foot or more, branched, and bearing a perfect sheaf of flowers (see Fig. 81, p. 609). One of the strongest of the plants had over one hundred flowers expanded at the same time. Before the flowering season was over each scape produced about sixty flowers, each of which was one and a half inches long, tubular, slightly curved, lobed, puberulous and colored a bright terra-cotta red. The plants commenced to flower in May and continued till August, when they ripened abundance of seeds.

A dry atmosphere, absence of shade, with a moderate amount of moisture at the root, and a well drained loamy

*Hooker in *Bot. Mag.*, t. 6903.

soil, were the conditions under which this plant grew so well at Kew. In pots the leaves are apt to get damaged, or to turn yellow toward the apex. Every year since its introduction this Streptocarpus has been a prominent feature in the Succulent House at Kew. So far as experience here has gone it is not worth while trying to save the plants after they have flowered. By sowing seeds every year a succession of young plants is easily maintained.

probably the finest Streptocarpus we have, is that called *S. Watsoni*. It has several large green leaves about twice the size of *S. Rexii*, and many flowered scapes of Pentstemon-like flowers, which are colored a rich rosy crimson with darker mottled lines in the throat. This hybrid has so far proved sterile with its own pollen, although it produces seeds when the pollen of some other kind is used. It can only be perpetuated by means of leaf-cuttings or by

Fig. 81.—Streptocarpus Dunnii, half natural size.—See page 608.

By crossing *S. Dunnii* with several other species some interesting and pretty-flowered hybrids have been obtained at Kew. The first were named *S. Kewensis* (from *S. Dunnii* and *S. Rexii*) and *S. Watsoni* (from *S. Dunnii* and *S. lutea*). These were figured and described in the *Gardeners' Chronicle* in 1887. Other crosses from these and *S. Saundersii* have since been raised, while by crossing the hybrids with each other and their parents a large number of forms, showing considerable range of variety in color and habit, have been the result. The showiest of all, and crossing its parents. By this latter method a good supply of seeds may easily be had, and the plants from them show scarcely any difference from that first flowered, except, perhaps, slightly in the shade of color. Many of the latest crosses which have flowered this year at Kew are of considerable promise. By crossing and selecting from the best of these plants it is probable that in a few years we shall obtain a race of Streptocarpi which, in a greenhouse, will fill as large a place as the Gloxinia now does in the stove.

Kew. *W.*

Foreign Correspondence.

London Letter.

GAMBIER.—This is an article of considerable value to the tanner, the dyer and the druggist. It is obtained from the leaves of a Rubiaceous shrub known as *Uncaria Gambier*, and is an ally of the Negro Peach (Sarcocephalus) and the Cinchona. Hitherto its cultivation and preparation have been a monopoly of the Straits Settlements; but owing to the fact that it has become difficult to procure, and, when procured, so often proves almost worthless through bad preparation and adulteration, its extended cultivation has for some time occupied the attention of the authorities at Kew. Seeds of the plant were therefore obtained from Singapore and a batch of plants raised from them at Kew. These have lately been dispatched, under the personal care of Mr. Morris, to some of the English colonies in the West Indies, where it is anticipated they will thrive and prove to be the starting point of a valuable industry. In the *Kew Bulletin* for October, 1889, attention was directed to the value of Gambier as "an article which every tanner in the kingdom uses more or less, and no other can take its place. It used to cost £10 per ton and now costs £45."

Gambier is obtained by boiling the leaves of the Uncaria. It is imported in the form of small squares or little round cakes. The finer samples are used in India for chewing along with betel leaf and medicinally. The plants grow rapidly and yield several crops of leaves every year for from fifteen to thirty years from the time of planting in the fields. They require a moist tropical climate, such as is favorable to the cultivation of the Cocoa-plant, Vanilla, Ginger, etc. The Gambier industry is at present chiefly in the hands of Chinamen, but their system is said to be wasteful and the preparation of the article unsatisfactory. With improved methods of cultivation and preparation the value of Gambier may be considerably enhanced. Its introduction into the West Indies will probably prove as important an event almost as the introduction of the Cinchona from Peru into India. In addition to its value to the tanner and the dyer, Gambier is known to possess useful medicinal properties; it is also used in beer-brewing. I call attention to this plant and its introduction into the West Indies because I observe that the United States Consul at Singapore has reported that "the exports of Gambier to the United States during the last three years have amounted to $1,060,000."

LILY-FLOWERS AS FOOD.—It is well known that the dried flowers of certain species of Lilium form an important article of food with the Chinese and Japanese. Examples of the Lily-cakes as prepared in Japan and China are in the Kew Museum. These cakes are used to flavor soups and as a vegetable, besides being supposed to have tonic properties. In the Consular Report on the trade of Chinkiang for the year 1886 it is stated that "The export of Lily-flowers has increased this year to 7,677,622 pounds. Not more than one-fifth is consumed here; the rest goes south, where it is used to flavor soup." In the *American Naturalist*, vol. xvi., p. 119, it is stated by Professor Penhallow that the bulbs of various species of Lilium are utilized as a source of food by the Japanese. In the Kew Museum there are examples of the food obtained from the bulbs of *L. cordifolium* in Japan.

I know of only two other recorded instances of the use of flowers as food. Of course by flowers the petals only are meant. The heads of the Cauliflower and the Artichoke are excellent articles of food, in which, however, the true flowers play a very small part. In India the flowers of the "Mahwa-tree" (*Bassia latifolia*) and of the "Phog" (*Caligonum polygonoides*) are collected and eaten by the natives. The "Phog" is made into bread, and Professor Church, who analyzed a sample of it, said that it contained more nutrient properties than rice and almost equaled Chick-pea. Mahwa forms an important article of food in many parts of India.

AMERICAN VINES.—In a recent letter I referred to the important place some of the species and varieties of American Vines now filled in those parts of Europe where the cultivation of the Grape is a staple industry. The destruction of this industry was threatened by the terrible Phylloxera, but by using the American Vines as stocks for the preferred varieties of *V. vinifera* this calamity has been averted. In time there will scarcely be a vineyard in Europe in which American Vines do not act as nurses to the best wine-producing kinds. The success of this experiment has induced other countries to follow suit, and I hear that for one of the Indian principalities 50,000 American Vines have lately been ordered from France. Has any one tried to cross *V. vinifera* with the best of the American kinds? Good results ought to be obtained in this way. Varieties possessing the constitutional peculiarity which renders them indifferent to the Phylloxera and with fruits equal to the best of the varieties of *V. vinifera* would be of immense value.

NEW CHRYSANTHEMUMS.—The National Chrysanthemum Society this week awarded first-class certificates to the following:

Beauty of Castlehill (Japanese).—An English seedling. The florets are large, rich yellow, tinted with bronzy red. The general appearance of the flower suggests Boule d'Or.

Beauty of Castlewood (Japanese).—This is in the way of E. Molyneux and Mrs. C. Wheeler, the florets being large, broad, deep orange yellow on the one side, rich maroon on the other. The flowers are as good in form as those of E. Molyneux.

Danae (Japanese).—Large-flowered, the florets long, broad and twisted, and colored brilliant yellow, shaded with red.

Countess of Lytton.—Very near to Ralph Brocklebank, but distinctly primrose in color. It is a sport from Meg Merrilies.

A. C. Kingston (Japanese).—The flowers of this are large, compact and good in form, while in color they are rich crimson. This is likely to become popular as an exhibition variety.

Sunset (Japanese).—A large-flowered variety of fantastic form, the florets very broad and colored orange on the upper side, bright red on the lower, while the reverse is silvery.

Princess Waldemar (incurved).—A beautiful flower, medium in size, compact and regular, and colored a rich flesh pink. It is in the way of Eve.

Violet Rose (Japanese, incurved).—A handsome variety, the florets somewhat incurved, but not compactly so, and colored a bright rose-red. This is a distinct and promising sort.

Mrs. E. W. Clarke (Japanese, incurved).—A large-flowered variety, with the florets incurved somewhat regularly, and forming a rather high centre; the color is bright lilac or mauve. It is a first-rate addition to this section of Chrysanthemums.

A USEFUL INSECTICIDE.—All Orchid-growers know something of the ravages of thrips and the difficulty of keeping them under in Orchid-houses. Some plants, such as the green-leaved Phalænopsis, *Phajus tuberculosus* and *P. Humblotii*, *Miltonia vexillaria* and *M. Roezlii*, are only rarely seen without the accompaniment of thrips or their marks. Sponging, tobacco fumigation, tobacco solutions, snuff and other supposed remedies are not always to be relied upon; at any rate, such is my experience. I am pleased, therefore, to be able to recommend what has proved perfectly successful as an insecticide for Orchids—namely, an article sold here under the name of "Lethorion." It is in the form of a cone, which, when set on fire, burns slowly and produces a peculiar vapor which does not injure the most delicate Orchids, but effectually destroys insects. We have used it for Oncidiums, Odontoglossums and Masdevallias, and I know that it has been used for Phalænopsis, Cypripediums and Orchids generally, and has proved effectual in every case. It is easily applied, and the only objection to it is the peculiar and somewhat disagreeable odor that remains in the house a day or so after its use. In this respect, however, it is no worse than tobacco. I have seen so many collections of Orchids suffering from the attacks of thrips, etc., as well as considerable injury done by attempts to eradicate the insects, that I gladly make known the value of "Lethorion" as proved by myself and others. I know nothing of the vender nor of the composition of "Lethorion," but I believe it can be had from most dealers in horticultural sundries.

London. *W. Watson.*

Cultural Department.

Rose Notes.

THE short days of the year make an interesting period for the Rose-grower, because continual watchfulness is essential at so critical a time. Ventilation should be given whenever the weather will permit, for pure air is essential, and yet the oft-repeated warning against draughts should never be forgotten, for nothing is more injurious to the soft young growth of a Rose than a current of cold air. The plants should now be syringed early in the day, so that they may dry off again before night, otherwise they are liable to be chilled, and any check is felt at this season.

It is not prudent to keep the house at the same temperature during severe and more moderate weather; the extra fire-heat demanded to produce such a temperature in extreme cold seems to reduce the vitality of the plants, and it is therefore the usual practice among careful growers to permit the temperature of the Rose-houses to fall from three to five degrees lower on cold nights.

While on this subject of temperature it may be stated that all varieties do not flourish at the same degree of heat, and

for this reason it is best where the space devoted to Rose-growing is limited to limit likewise the number of varieties grown, for it is certainly better to grow two varieties well than to attempt to grow a dozen sorts in one small house and then fail with eleven of them. For example, Papa Gontier and American Beauty are seldom seen equally healthy in the same house, for the reason that while the former enjoys a night temperature of fifty to fifty-two degrees the latter is seldom seen at its best unless grown at fifty-eight to sixty. W. F. Bennett also seems to enjoy a moderately high temperature, and strange as it may seem in the case of a Hybrid Tea, still it is true that some of the best plants of this variety have been grown quite wet at the root. This rule as to moisture, however, may not be infallible, as the behavior of this variety varies considerably in different soils.

Among the earliest hybrid Roses to be seen this season are fair blooms of Mrs. John Laing, some of these having been in the market for two or three weeks past. Apparently this fine variety has only been distanced in earliness by the new pink hybrid shown by Mr. Julius Roehrs at the late Chrysanthemum Show in Philadelphia and at some other exhibitions. This latest candidate for honors as a forcing variety has thus far been shown without a name, and consequently has been claimed by some Rose-wise persons to be merely an old variety re-introduced, while others are equally positive that it is really new. Be this as it may, the flowers shown were of good color, size and substance, and the introducer deserves credit for making its good qualities known whether it be new or old.

The new Polyantha Rose, Clothilde Soupert, to which some reference has already been made in these columns, has created a good impression during the past summer, its charming little flowers being so freely produced that it will doubtless be largely planted next season. These miniature Roses have become very popular of late years for bedding out, and with good reason, too, for they are seldom out of bloom.

Wootton as an out-door Rose in this locality did not prove a success, but for forcing it is again on trial to a considerable extent, and as its needs are better understood it will probably pay for the experiment. Possibly this variety may do better out-doors in a more southern latitude, as several of the Hybrid Teas that cannot be grown to advantage here are now grown so well in South Carolina that some of our northern nurserymen take this means of supplying their stock. That is, they consider an establishment in the south for raising such varieties preferable to importing them from Europe. This system possesses the additional advantage that the home-grown stock is all on its own roots, whereas the imported Roses are almost invariably budded or grafted.

The use of wood ashes as a fertilizer in Rose-houses is again strongly advocated by some growers, and, while these are undoubtedly of value, yet it will not do to depend on them entirely. Wood ashes will certainly not encourage the spread of Fungus through a bed as an over-application of barn-yard manure will, and in a comparative test of two parallel beds of the same variety, in one of which the fertilizer was ground bone and in the other wood ashes, the evidence at the time I saw them, about October 15th, was in favor of the ashes; but, of course, it was too early in the season to accept this evidence as final.

Holmesburg, Pa. *W. H. Taplin.*

A California White Oak (*Quercus lobata*).—See page 606.

The Calochortus in Cultivation.

IN my experience here the various species of Calochortus are hardy out-of-door plants. But eastern growers who use them for forcing purposes may perhaps gain some hints as to their cultivation by some statement of the conditions which here secure the best growth. In England they are hardy, and I believe that Messrs. Gillett & Horsford, of Southwick, Massachusetts, treat them as half hardy. I am inclined to believe that many species would prove half hardy in the east. *C. Nuttallii*, usually known as *C. Gunnisoni*, the true *C. Gunnisoni*, *C. macrocarpus*, *C. aureus*, *C. lugens* and *C. flexuosus* are natives of the Great Basin, and are occasionally subject to as low a temperature as twenty degrees below zero. It is a dry cold, and the bulbs are in loose sand from four to six inches deep. I have dug *C. Leichtlinii* in the Sierra Nevada at an altitude of 9,000 feet and a few hundred yards from snow banks that did not melt that season.

A snow-fall of a few feet is common where *C. nudus*, *C. elegans* and the Oregon species grow. Here on the coast range of northern California fourteen degrees above zero is the severest temperature experienced, and in it the leaves of

Calochortus suffer no injury although frozen stiff every morning.

It is seldom that two species of Calochortus are found growing together. In a given section of country but one type of the Mariposa Tulip is usually found and one or two species of the Star Tulips; the Mariposa Tulips in warm, open situations, the Star Tulips in open woods or shaded hill-sides. Each species seems to cling to its particular soil and exposure, and even varieties of the same species seldom intermingle. The following usually are native to a sandy soil with a mixture of mould: *C. aureus, C. macrocarpus, C. Nuttallii, C. flexuosus, C. Gunnisoni, C. Kennedyii, C. venustus roseus, C. Weedii* and *C. Palmeri*, among the Mariposa Tulips, and *C. albus* of the Star Tulips. *C. luteus* is native to a stiff, rich, clayey soil, that peculiar clay known in California as adobe. *C. splendens* and the varieties of *C. venustus* known as *oculatus, citrinus* and *purpurascens* are found in light shallow clays. *C. Leichtlinii* is alone found in decomposed lava, sand and ashes. Of the Star Tulips, *C. lilacinus, C. nudus* and *C. uniflorus* grow in the sandy loam of moist meadows; *C. pulchellus, C. Maweanus, C. Benthamii, C. cæruleus* and *C. elegans* are usually found in the light soil, gravelly or clay, of open woods.

The species I have named comprise nearly all of the cultivated species. Nearly all of the species named will stand much moisture during the growing season. The uplands where many of the Mariposa Tulips grow are at a saturation point for some time during the rainy season, and of course water stands on the meadows where *C. lilacinus*, etc., grow during the winter. But before the Calochortus are ready to blossom the water has dried up and the soil begins to bake. A few weeks later the plant is dried up or blown away and the soil is baked hard. Nature has provided the bulb with a protection from the heat and dryness in the shape of a fibrous covering which is thickest in the desert varieties. It will be found that as often as not the rootlets at the base of the bulb are dried up when the plant is in bloom; in other words, the growth has ceased, and it only awaits the ripening process.

In planting them the bulbs should rest on firm soil. I use boxes about ten inches deep and fill up to about four inches of the top with clay loam and tramp it down. I then plant the bulbs, using a little sand or loose soil to stick them in. I fill up with the soil I consider best for that particular species and press firmly. Take it as a whole, a mixture of sandy loam, with a little mould or finely rotted chips, will more nearly accommodate all species than any other mixture that I have tried. Mariposa Tulips need a warm, sunny situation, Star Tulips partial shade; but very good results can be had in planting side by side regardless of this. Of all the species that I have grown I have found *C. lilacinus* the most susceptible to cultivation, and next to it the varieties of *C. venustus*, especially *roseus*. *C. venustus oculatus* is wonderful in its variations in coloring, *C. venustus citrinus* is only different from it in color, and there are shades innumerable between the creamy white of one and lemon-yellow of the other.

To choose the most desirable from a number of species, all of which have the beauty and coloring of the Calochorti, is a hard undertaking. If I were to choose four they would be *C. Nuttallii, C. venustus oculatus, C. albus* and *C. pulchellus*, with an inclination to ask that *C. lilacinus* be thrown in as an extra.

Ukiah, Cal. *Carl Purdy.*

Our Twenty "Best" Apples.

THE American Pomological Society's list of apples contains but twenty native sorts to the names of which are affixed the letter "b," indicating that, in the judgment of the Society, or of such of its membership as were present in the meetings where the quality of apples was under discussion, these alone are entitled to rank, as to dessert quality, above all other apples native to this continent. This list contains no sweet apples. As to season, four are summer, three early to late fall, and thirteen are winter varieties. In origin seven are from New York, three from Massachusetts, two from Connecticut, one from Pennsylvania, six eastern, with state unknown, and one probably from Ohio.

May it not be permissible and profitable to review this list with an eye to its amendment, and perhaps its increase, at some future meeting of our Society? May it not be true that in other states, from a wider range of country, there are apples deserving a place in this roll of honor? Perhaps a majority of the Society might favor dropping the names of a few which have ceased to be planted from cultural defects or because they are superseded by more desirable sorts. Mere high quality, or local preference, without other merit, ought not to admit to a select fruit list endorsed by a continental society of practical fruit growers. The word "best" should not be made too narrow in its application here. The quality being the same, or equal, other merits ought, I think, to be taken into consideration. Beauty must not be entirely ignored. Adaptation to general or a wide range of cultivation is worth considering. Health and productiveness of tree are important considerations. Not that these should admit, but that the lack of them may exclude an apple which, considered merely on its flavor, would be a proper candidate. I think we may take Pomme Grise, for instance, as an apple of so few other merits that its excellent quality alone should not give it a place.

AMERICAN SUMMER PEARMAIN.—This fine apple, tracing its descent to an equally popular, but really inferior, English apple, is well entitled to its place. It has beauty, medium size and a fairly productive and healthy tree, requiring high culture, however, to develop the merits of the fruit.

BELMONT.—From all points here is a first-rate apple, of good size, great beauty, a healthy and productive tree, with a crisp, delicate and most agreeable fruit. Its season extends beyond the holidays.

BETHLEHEMITE.—Like the preceding, this apple is of unknown origin, and the excellence of both was first widely recognized in Ohio, this being named for an Ohio town, as Belmont is for an Ohio county. Downing thinks it plainly a seedling of Newtown Spitzenberg, which it much resembles. The tree is a good grower and productive, while the fruit, of medium size, is well formed and well colored. The flesh is juicy, rich, mild and aromatic. An all winter apple.

BULLOCK'S PIPPIN is the oldest American Golden Russet, also locally known as Sheep's-nose, a small, plain-looking apple, but of a most remarkable pear-like flavor. The flesh is yellow, tender, juicy, spicy and rich. Early winter. It does not always ripen up perfectly, and the tree is subject to disease. Perhaps this variety might be dropped from the "b" list, along with Pomme Grise, which seems to be a close relative.

COGSWELL.—Here is an old Connecticut fruit, and to it are assigned by the books almost every merit—a vigorous, productive tree, fruit of a size above medium, regular in form and size; a rich yellow color, well marked with red; fine grained yellow flesh, tender, rich, juicy, aromatic and a good keeper. Why is not such an apple more often found in the general market?

EARLY JOE.—A well known little August apple, which is often seen in market and deserves its place. Yellow, with red striping; flesh white, tender, juicy, vinous. A general favorite.

ESOPUS SPITZENBERG.—Downing says this Spitzenberg is considered by good judges equal to the Newtown Pippin; but our Society excludes the latter from a list where the former stands prominent. "Flesh rather firm," says Downing, and it is all of that. In fact, it is a hard apple that never softens until it decays, and its high flavor alone gives it a place here. It is really a "best" pie-apple. Unfortunately, the tree is not vigorous, and it is usually an unprofitable apple to grow for market.

FALL WINE.—This fruit is so subject to disease as to be not worth growing, except perhaps in a few localities, and I think it should be dropped, although a fine apple and the nearest to a sweet one that appears on this list.

GARDEN ROYAL.—Here is my favorite; and yet it must be said of it that it is strictly a garden apple, and worth growing only on the condition of high culture. It is of sea-side origin, and I have never seen it thriving so well as within the range of New England's fog-banks. The tree is healthy and productive, and with the high culture it requires I do not see why it may not be grown profitably from Portland, Maine, around to New York City. Wherever it can be well grown there is money in it. Season, August and September.

MELON.—A New York apple of good size, yellow, handsomely striped and shaded with red. Tree a moderate grower, and usually a good bearer. The fruit is of full medium size, often ribbed, but not prominently. Flesh white, tender, juicy, sub-acid, vinous. It bears handling poorly, but carefully packed it can be sent short distances in good order.

MOTHER.—Another apple of the Massachusetts coast which grows nowhere else so well. Smallish, conic, red. Flesh yellow, tender, rich, sub-acid. Rarely seen in market, yet common in private grounds and highly esteemed.

NORTHERN SPY.—It is difficult for me to understand why the Spy is taken and King of Tompkins left off this list. In quality the Spy varies greatly, and at its very best is better than the King; but not as usually seen in the market.

PORTER.—This is the favorite fall apple of Massachusetts and

when well grown its quality is certainly very good. It has, however, been to a great extent superseded by the Gravenstein, and growers call it an unprofitable apple in competition with that variety.

PRIMATE.—There is no better late fall and early autumn apple than the Primate, and it is easily grown.

RED CANADA.—It is hard to find fault with the old "Nonesuch," and they still grow it large and fair in some parts of Michigan. But it is an apple very apt to "go back" on the planter. In New England and generally in the east it is a sad failure.

SPITZENBERG. — This (Newtown) Spitzenberg is much more to my taste than its brother of Esopus. The tree is more healthy and productive in the long run, and the fruit is not only rich, spicy and vinous, but it is tender and crisp.

SUMMER ROSE.—Here is a nice little apple, not much larger than the Lady Apple, and quite as good in its season, but no more worthy a place in a select list.

SWAAR.—A noble apple truly, as Downing calls it. No one will object to the Swaar; but few have the soil to grow it in perfection. It ought not, therefore, to be recommended for general cultivation.

WAGENER.—A good tree and a choice apple, provided the fruit is severely thinned. It is only so that it can be entitled to the place assigned it. As usually grown it is unprofitable and its high quality much obscured.

Let me conclude shortly with the query, Whether the time has not come to revise, prune and possibly somewhat to enlarge this list of America's "best" apples?

Newport, Vt. *T. H. Hoskins.*

The Grape Market.

A CORRESPONDENT writes that "he does not understand why grapes should be so cheap when there is such a scarcity of other fruits." One reason for these low prices I attribute to over-production. This idea is often characterized as ridiculous, but that the supply exceeds the demand, except at the lowest prices, is evident to all observers. The area devoted to grape culture in New York State during the last decade has been immensely increased, and it is from this region that New York and the surrounding cities receive their chief supplies, and notwithstanding serious damage to the crop in some parts of the state from rot and mildew our markets have been flooded the past autumn with this fruit to an extent never before known.

Another agency in depressing prices is the immense quantity of unripe and inferior fruit sold. Purchasers become dissatisfied and disappointed after a few trials of such fruit, and many refuse grapes altogether on this account. Growers injure themselves and the market by putting out such fruit. The desire to be early in the market so as to command the highest prices often overreaches itself, unless the fruit is of excellent quality.

The growers are not always responsible for this inferior quality of their products, for it is a well known fact that soil and climate are important factors in this matter. New Jersey fruits as a rule are more highly colored and better flavored than the same kinds produced in western New York. The Concord, most widely disseminated of all our grapes, is of much higher quality grown here than there. It seems to improve, not only in this respect, as it comes farther south, but also loses its foxiness. This change holds good with other fruits, and is doubtless due to our longer season, and perhaps to the presence of more iron in our soil. I once took some Baldwin apples to a meeting of the western New York Horticultural Society which were so highly colored that some of the experts there questioned the correctness of their name.

This difference in the quality of fruits grown in different localities is apparent to persons of critical tastes who have given any attention to the matter. It is worth while to quote the results of six chemical analyses of Concord grapes made in 1885 by Professor G. C. Caldwell, of Cornell University: Three samples of New Jersey Concords showed an average of 16.09 per cent. of sugar in the juice, and three of New York Concords an average of 13.54 per cent. of sugar. The grapes found in our markets would doubtless show a much wider difference if submitted to the same test.

A few years ago, when the Niagara Grape Company began to solicit purchasers for their vines on the terms they had adopted, the plan met with a good deal of criticism. People who accepted those terms were laughed at for their folly in allowing strangers to get a mortgage on their lands in this way, and it was predicted that Niagara grapes would soon be as cheap as Concords. The lapse of time has proved these prophecies true in part. Most of these so-called lunatics who bought the vines early have realized a handsome profit from their venture. The past season, however, has developed the fulfillment of the prophecy as to the price, as Concords and Niagaras have sold at the same price; and in fact these cheap Niagara grapes were not as good as good Concords. The commission merchant who sold my Niagara grapes told me that it was hard to hold up the price when they could be bought on the same block at thirty cents for a five-pound basket. I bought one of these baskets which came from a vineyard in central New York. The clusters were of good size and compact, and the berries full and large, but a single taste was enough to show that for table grapes they were dear at thirty cents a wagon-load. It is little wonder that many Niagara grapes have been sold in this market for from fifteen to twenty cents a basket, although when expenses for commission, freight, expressage, packing and picking have been deducted the margin of profit for the grower must be very slender. It is grapes of this quality which depress the market and tend to ruin the reputation of any variety. Merchants do not regard quality as much as they should, and buyers generally try to force the best down to a level with the cheapest. It seems, therefore, that the only remedy for the present low prices is to increase the percentage of fruit of the first quality and reduce the production of inferior grades. When consumers find they are getting a fruit that is palatable and healthful they will buy abundantly. As it is they have reason to be suspicious of anything in the shape of a grape.

Montclair, N. J. *E. Williams.*

Cattleya Percivaliana alba.—One of the few plants in existence of this rare and beautiful variety is now in full bloom in the collection of Mr. Hicks Arnold of this city, and it carries three handsome flowers well formed and of snowy whiteness except a rich orange stain in the throat. Each sepal is broad and flat, the petals round and furnished with a fine fringe. The lip also is broad and delicately frilled. The plant occupies a basket, and is suspended near the glass throughout the year. The ordinary form of *C. Percivaliana* is now enriching many collections with its showy blossoms, and is gaining popularity among florists as a useful and free-flowering species for cut flowers. It is very easy to cultivate, and in its native home is found growing at 4,000 to 5,000 feet elevation on rocks fully exposed to the sun. Three, four and sometimes five flowers make their appearance on a spike and remain a month in good condition. It will thrive well either in a pot or basket in a compost of good fibrous peat and a small portion of clean sphagnum with ample drainage. After the flowering period is past water should be sparingly given to ripen the new bulbs. During the summer months, the growing period of the plant, it should have a temperature of sixty-five degrees. A few degrees higher will prove beneficial, and a gradual reduction of water as the new growths approach completion will induce them to flower.

Summit, N. J. *A. Dimmock.*

The Forest.

Value of Mountain Forests.

THE first and most important function of mountain forests is the preservation of the mountains themselves by clothing them with soil. The relation of mountain forests to the soil out of which they grow is curious and interesting. The soil now produces the trees, but the forest has produced the soil which now nourishes it. There was a time when there was no soil on the mountains of New Hampshire, nor on any portion of the Appalachian System—when the mountains were only ridges, slopes and summits of bare rock. They were composed wholly of mineral substances, of matter entirely inert and incapable of supplying food to vegetable organisms. There was not an atom of soil on the rocks of the whole region, and no vegetable growth of any kind. Then, when conditions permitted, Nature began a new order of things here with some of the lowest forms of vegetable life, resembling the lichens of our time. Some of these could grow here and there on the rocks, and whatever could grow would die and decay, but would not wholly perish. Some slight particles of its fibre or substance would remain undestroyed through all the changes of decomposition, and in the course of centuries or thousands of years a thin film of soil was accumulated here and there sufficient to nourish vegetation of a little higher character and organization than had belonged to the pioneer organisms.

How great the distance from that far beginning to the first trees! And very poor and inferior trees the earliest ones were, when they did appear, compared with those which make

our forests now; but they were the best that the still scanty soil would sustain. Ever since the leaves of the first trees began to fall the trees have been slowly adding to the deposit of soil which now covers the rocks, and which has reached the depth and productive potency required to sustain the noble forests of our own time.

The great stratum of fertile, life-producing soil which now lies folded around the shoulders of the hills is the result and accumulation of patient ages of dendral toil. Nature has wrought incessantly, through mighty cycles of time, to clothe the desert rocks with life and beauty, and in the untainted air of these lofty slopes and plateaus she now grows forests which are like the columned aisles of vast cathedrals. Ships which cleave the waves of every sea, and the cottages and palaces of mighty cities, with myriads of structures for man's varied industries, have been builded of the materials supplied by our mountain forests. The superior quality of the timber now grown, and the vast quantities in which it is produced, are effects of the wonderful fertility which the soil has attained. It is richer than ever before, but it has not reached the limit of possible productiveness. There is no such limit, indeed, and if our mountain forests were rightly managed they would forever increase in fertility, and the quality of their timber would be thereby gradually improved.

A forest is the only crop, so far as I know, which can be produced perpetually on the same ground without diminishing in any degree the fertility of the soil. It is a remarkable fact that a forest not only does not impoverish the soil out of which it grows, but that it actually enriches it. As the soil is thus improved it responds by producing superior timber. A mountain forest would yield better timber, and more of it, at the end of a thousand years of proper management than at the beginning, and proper management means and includes the cutting of every tree when it reaches its best estate.

FARMING IN MOUNTAIN REGIONS.

The entire effort at farming in mountain forest-regions in this country is often a most destructive and suicidal mistake. Much of the ground that has been cleared for cultivation in such regions is so steep that if forest-conditions are once destroyed upon it the soil is certain to be washed away. It has always been manifest to intelligent observers that such land is suited to the perpetual production of timber, and of that crop alone. In many instances in our state land has been cleared and "farmed" with very slight returns which would be much more valuable than it now is if it were still clothed with forest. The yield of farm products in such cases is scanty and uncertain. In some places the land is too high and cold for successful cultivation. There are frosts late in spring and early in autumn, and sometimes in every month of the brief summer, and the soil is soon exhausted. It would be difficult to find anywhere an instance of more obvious natural adaptation to a particular function than our whole mountain forest-region exhibits in its fitness for permanent forest-growth and its unfitness for any permanent beneficial use after forest-conditions have been fully destroyed. It would have been much better if some of our "abandoned farms" had never been cleared. In some parts of our country vast values have been permanently blotted out by clearing and cultivating mountain land, and those states will be poorer for all time to come by reason of the resulting destruction and removal of the soil of considerable areas of their mountain regions.

RUIN BY FIRE.

The most fatal agency in destroying the soil of a mountain forest-country, and in wrecking the mountains themseves, is that of fire, and in the history of most mountain forest-regions the operation of this agency has been closely connected with the attempts to cultivate the soil to which I have just referred. In various regions of the Appalachian mountain system many of the farms have been cleared simply by burning the timber and brush left on a tract after it has been lumbered over, and the first crop is planted in the ashes. In a few years the soil is exhausted or washed away, and the farmer goes a little farther up or down the valley, or across the stream which runs through it, and repeats the operation. But the injury to the mountains which is caused by the destruction of the soil of these limited tracts which have been cleared for cultivation is trivial when compared with the losses which have resulted from the forest-fires having their origin in these clearings.

When we consider the rapidly increasing density of the population of our country, and the great advance in the value of all fertile lands, especially in the eastern states, it is obvious that the complete destruction of the soil of any considerable area is a very serious matter. There are few kinds of losses or misfortunes affecting property which are so calamitous as this. It is a crime against posterity, a permanent subtraction from the wealth and the capabilities of the country. The soil is, to a very great extent, the country itself. A burned city can be rebuilt, and the system of insurance distributes the loss widely. But there is no insurance on the soil of our mountain forests, and when it is once thoroughly burned it will require mighty cycles of time to restore it. Its producing capacity for ages, and all the "promise and potency" of a perpetual succession of valuable crops, are at once reduced to nothingness.—*From the Report of J. B. Harrison, Commissioner of Forests for New Hampshire.*

Correspondence.

A Good Tree for the South.

To the Editor of Garden and Forest:

Sir.—Your southern readers, perhaps, are not generally aware of the value of *Moringa pterygosperma* as an ornamental tree in the southern states. It is the Horseradish-tree of India, the fleshy roots when young being equal if not superior to the roots of the common Horseradish. Those in Mexico are highly prized and form a staple article of diet. From the seeds are prepared the finest "oil of benne" used by jewelers, and the seed-pods are said, when young and tender, to be edible cooked in soups.

The tree is a very rapid grower. I have specimens that are only four years old from seed and which are well bushed out and form excellent shade trees fully thirty-five feet in height with trunks from six to eight inches in diameter, while some of my young trees, planted only a year ago, are twenty feet high. The Moringa has graceful, ternately decompound leaves, and produces, when only a year old or sometimes even earlier, clusters of delicate flesh-colored flowers resembling in size and shape those of the Wistaria, with a fragrance not unlike that of Sweet Peas. The flowers are followed by long pods which contain the triangular winged seeds.

I am much surprised that this tree is so little known in the United States, especially in the south. It is very easily propagated either from seeds or by cuttings, and it thrives on any well drained land of good quality. It can be grown in the north if plants are started in a greenhouse during the fall and then planted out in the spring. This tree will add variety to any garden through the summer and autumn, and when cut down by frost its roots can be dug up and utilized.

I consider the Moringa a very valuable addition to our list of ornamental and economic plants.

Villa City, Fla. *George T. King.*

From a Foreign Creditor.

To the Editor of Garden and Forest:

Sir.—We shall be much obliged if you will inform us through your columns how an English firm can recover debts which are not forthcoming from America, whether by summons or in what manner, and whether the statute of limitation of a debt is the same as in England—six years.

Langport, England. *Kelway & Son.*

[An American debtor can be summoned in any court where he can be found, either by an American or a foreigner. Practically, the best way for our correspondents to collect debts due them in this country would be to place the matter in the hands of a lawyer to manage. The statute of limitation of a debt is six years in this country.—Ed.]

A Weeping Maple.

To the Editor of Garden and Forest:

Sir.—Last summer a writer in the *Critic* made some inquiries concerning a peculiar Maple-tree which was standing in a long row of ordinary trees of the same species by the old Hopkinson place, in Bordentown, New Jersey. It was stated that this exception was a particularly large tree standing nearer the house than the others. Within about fifteen feet of it is the stump of a great Weeping Willow which was cut down many years ago. The large Maple seems to have the peculiarities of this Willow—that is, its leaves are more feathery than is usual with Maples, and its branches droop just as the Willow's did until they almost sweep the ground.

The inquiry was made whether the peculiar form of this Maple was due in any way to its proximity to the Willow. The matter was referred to Garden and Forest, but I have seen no response.

Trenton, N. J. *Q.*

[It is not probable that the writer in the *Critic* had any belief in the "theory of re-incarnation" or that the Willow

had any influence in forming the Maple. But Professor A. C. Apgar, of Trenton, who visited the Bordentown tree not long after the note concerning it had appeared in the *Critic*, asked a resident of the neighborhood for a ladder in order to get a specimen of the "Weeping Maple," and he was at once told about the proximity of the Weeping Willow, which, according to the man's notion, completely explained the phenomenon. White Maples not rarely assume a somewhat drooping habit, and this tendency differs very widely in different trees. Professor Apgar writes that between the Hopkinson place and the station, which distance is not more than a length of two or three city blocks, there are three other Maple-trees which show a marked weeping habit. The one in question, however, is more decidedly pendulous than any specimen which has come under his observation. Some of the twigs, of which sketches were sent to this office, hang in as nearly vertical lines as those of any of the so-called "weeping" trees. One twig with over thirty-six inches of growth for the current year shows that the Maple is a vigorous one. Specimens of the leaves which were sent differ little from those of ordinary White Maples, although they may have been a trifle more deeply cut. In this particular, too, the leaves of this species vary considerably.—ED.]

The Kansas Horticultural Society.

Orchards on the Prairies.

DURING the three days' session of the Kansas State Horticultural Society, which began at Topeka on December 2d, the usual wide range of topics was under discussion, but throughout the entire meeting it was easily seen that the subject of paramount interest was that of the Apple-orchard, and especially the growing of market sorts. This was doubtless due in part to the shortage of the apple crop in the east and the presence in Kansas last fall of a host of eastern buyers who took the surplus of apples at high prices. Much had been published in state papers about the Wellhouse Orchard of Leavenworth County, and when the manager and part owner, Mr. F. Wellhouse, of Fairmount, took the floor as chairman of the Standing Committee on Orchard Culture he was plied with numerous questions relating to every feature of the great enterprise. From his replies and from additional information kindly given I gathered the following: The orchard is owned by Messrs. Wellhouse & Wheat and contains 437 acres of trees in bearing, planted in 1876, 1878 and 1879. Of the principal varieties planted Ben Davis occupies 225 acres, Missouri Pippin seventy acres, Winesap seventy acres, Jonathan forty acres, Cooper's Early White sixteen acres and Maiden Blush sixteen acres. In 1889 and 1890 of Ben Davis 370 acres were planted, Missouri Pippin 260 acres, Jonathan 120 acres, York Imperial fifty acres and Ganot twenty acres. There were planted in the older orchard a total of 52,000 trees, of which it is estimated that 40,000 are alive to-day. The heaviest loss occurred from the effects of the winter of 1884-5. With a very wet fall the trees made a late growth and went into the winter full of unassimilated sap. With the mercury at twenty degrees below zero during January many of the trees burst their bark, others were split through the trunk. Many that did not die from this injury the next season only lived a year or two longer. The loss from this cause was greatest among the Ben Davis trees, amounting to about fifteen per cent. of the whole. It will be seen that the number of trees planted gives about 119 to the acre. It is but fair to say that Mr. Wellhouse now regards this planting as too close, and their young orchards mentioned above are set sixteen feet apart, in rows thirty-two feet apart, running north and south, which will admit of thinning one-half if found desirable.

The location of these orchards is upland-prairie of average fertility, the subsoil being a red clay containing considerable sand. Mr. Wellhouse advises cultivating the land to corn till the trees come into bearing, after which he would seed to Red Clover. Stock should be kept from the orchard, especially hogs, as their tramping packs the ground, and by rubbing and rooting about the trees they do a great deal of damage. The Clover-crop is not removed from the orchard, but with a long machine resembling a stalk-cutter, but with smaller diameter, the weeds and clover are cut and allowed to remain on the ground, the object being to secure a loose, mellow soil among the trees, resembling a forest-bed as much as possible. Spraying with London Purple in the proportion of one pound to 100 gallons of water was tried last year to destroy the codling moth. A part of the orchard was sprayed twice and the rest three times; but the third application seemed to scald some of the leaves without being of any benefit.

Mr. Wellhouse has discarded, as useless for his purpose, all the spraying machines and nozzles upon the market, and he uses a tank fifteen inches deep, three and a half feet wide and four and a half feet long, slung between the wheels of a wagon. Upon this is mounted a common rotary pump, operated by means of a sprocket-wheel and chain from one of the hind wheels. This gives a positive action, starting the spray the instant the wheel starts and stopping it as quickly, avoiding the unpleasant waste and drip occasioned by the pressure from the air-chamber of the force-pump. The nozzle finally adopted is one of their own construction, having a fine slit in the casting resembling a gas-burner. This gives a broad, fan-like spray, and enables the operator to cover one side of the row of trees in driving by, at the same time managing the team. Ponds for collecting surface water to be used in spraying are constructed at convenient distances by damming ravines or draws. A man and team spray 160 acres in about five days. Adding to this the cost of poison and it brings the cost of spraying once to about fifteen cents per acre.

Everything in connection with the enterprise is reduced to the most careful system, and an accurate account has been kept of all expenses and receipts since the planting of the orchard. The actual yield of so large an orchard, over a period of eleven years, is a matter of much interest, and I am permitted to give you the following figures: In 1880, 1,594 bushels were gathered; in 1881, 3,887; in 1882, 12,037; in 1883, 12,388; in 1884, 11,726; in 1885, 15,373; in 1886, 34,990; in 1887, 33,790; in 1888, 20,054; in 1889, 11,952; and in 1890, 79,170 bushels. The last crop, it will be noticed, is more than double that of any previous year. This, at the high prices which ruled, gave a gross income of about $50,000. The entire outlay for the year, including barrels for shipment, amounted to $14,000, of which $7,000 were paid for picking. This left a net profit of $36,000, or $82.38 an acre, which gives considerable color to the story which went the rounds of the press during the fall that the crop from many Kansas orchards this year had sold for more than the entire land was worth.

His Jonathans gave Mr. Wellhouse the best prices, bringing from $3.50 to $3.75 a barrel of three bushels. Ben Davis, Winesap and Missouri Pippin were contracted to eastern firms at $3 a barrel. During the entire eleven years the Missouri Pippin has taken the lead for profit, and this year's returns placed it still further ahead. The Winesap they have not found as profitable as the other sorts, the size of the fruit averaging too small, and it is not included in their new plantations. The York Imperial they regard as a promising apple for their locality, and they are planting it quite extensively. The Ganot, a new apple originating with a fruit-grower of that name near Lee Summit, Missouri, was mentioned with much favor by Mr. Wellhouse. It is described as closely resembling the Ben Davis in tree and fruit till the latter begins to color, when it takes a much deeper color, has more yellow and firm flesh, and is generally conceded to be a better keeper. Mr. Wellhouse closed his remarks by adding, very aptly, that he was looking with a good deal of interest for the coming apple, and wanted to get some trees of it to plant.

In the general report on fruits from different parts of the state the Winesap received rather better treatment, and will doubtless continue to be planted largely as a reliable late keeper of much better quality than either Missouri Pippin or Ben Davis. Rawle's Genet, except in a few favored localities, was declared to crack and rot badly on the trees, besides keeping poorly after it was gathered. It is being largely discarded.

An instructive paper prepared by Professor L. H. Bailey, of Cornell University, entitled "Causes Affecting the Longevity of Orchards," was read by the Secretary. The ground taken was that the supposed greater longevity of old seedling orchards in the east was more apparent than real; the trees which attracted attention being the few fittest to survive, while the many which perished prematurely escaped notice. The popular cry against root-grafting on stocks from pomace seed, as tending to deteriorate the vitality of varieties, had no foundation in fact. The even stand and uniform character of trees in modern orchards showed that the cion either dominated the stock or had become self-rooted. The short life of many orchards in the west must be accounted for by the fact that they were in a prairie region beyond the limits of natural forest-growth.

The general opinion of the members of the Society seemed to be that while the older orchards of the state show that they are destined to be short lived, we should not be discouraged by this fact. With the abundance of comparatively cheap land in

the state and the small outlay needed for planting, young orchards should be set as fast as the old ones show signs of failing, and the supply of vigorous, bearing trees kept up.

It was thought that the rapid development of the country to the north and west beyond the range of profitable Apple-culture must give a market for Kansas apples at paying prices for a long time to come. *S. C. M.*

Notes.

Another use has been found for the bark of the Cork Oak. It seems that in Europe "cork concrete," made of ground cork mixed with a cement that is called "liegine," is somewhat extensively used in building. It is said to be as strong as the porous terra cotta which is known as "terra cotta lumber," to be better in its capacity for holding nails, and also as a non-conductor of sound, and almost equally fire-proof.

We have received a photograph of a superb specimen of *Phalænopsis Schilleriana* grown by John Hosken, Esq., Q.C., The Dale, Toronto, Ontario. The plant carries seventy-five fully expanded flowers. A visitor who has seen it states that the flowers show great substance and breadth of petal, while the leaves were nearly two feet in length. The plant grows at will in a perforated pot, and a large tank under the bench near it is constantly full of water.

The annual meeting of the American Forestry Association will be held on Tuesday, December 30th, at the Department of Agriculture, Washington. At the morning session officers for the ensuing year will be elected and general business transacted; in the afternoon there will be another session for discussion and business; and in the evening a session will be held at the National Museum conjointly with the American Economic Association, where papers on the proper treatment of forests on the public lands of the United States will be read and discussed. It is particularly desired that as many of the Vice-Presidents as possible will be present.

A fine mass of the beautiful and fragrant, rose colored flowers of *Luculia gratissima* was sent to a recent meeting of the Massachusetts Horticultural Society from Mr. Hunnewell's gardens at Wellesley. This handsome evergreen shrub is a native of the temperate regions of the Himalaya and has long been a favorite in English gardens. It is particularly valuable because it flowers at a season of the year when flowers are scarce. *Luculia gratissima*, nevertheless, and this is true, too, of the second species of the genus, the still more beautiful *L. Pinceana*, is very rarely seen in this country. Both species can be successfully cultivated in pots, although they do best when planted out in a border in a moderately warm greenhouse.

Popular Science News gives a report of the meeting of the British Association for the Advancement of Science, held recently at Leeds, from which it appears that a large part of one day was devoted by the biologists to a consideration of the subject of teaching botany in schools, introduced by an able paper by Professor Marshall Ward. Botany, he urged, should be taught, not in order that names and facts may be committed to memory, but that habits of accurate observation may be acquired by the pupil, and great principles and laws grasped which in future may be applied under any special conditions. In these views he was supported by the eminent biologists present, who, one and all, agreed that it is time to leave the blind worship of facts, and, instead of measuring a scholar's progress by the amount of dogmatic information imbibed and put into an examination paper, to look to his understanding of the relation between facts and the intelligence with which he describes what he sees.

A *Tribune* correspondent writes that 10,000 tons of fresh, dried and canned fruits have been sent overland by rail from California during the season, and this enormous amount does not include what went by express. As much of the finest perishable fruit was expressed, this probably amounts to 100 car-loads. The value of these overland fruit-shipments is roughly estimated at $10,000,000. Of prunes California shipped 15,000,000 pounds, and of raisins 40,000,000 pounds. Four thousand car-loads of oranges will be sent east this winter, an increase of 800 car-loads over last season. The first car-load shipment of oranges this season went from northern California, where five years ago it was declared that Oranges could not be grown except in gardens protected by hedges. This initial shipment came from Oroville, Butte County. A new feature this year is the shipment of early winter vegetables to the east, the railroads having made a favorable rate. Especially in Los Angeles and other southern counties this promises to be a great industry.

It is not generally known, says a writer in *Nature*, that the Chinese grow the Chrysanthemum as a standard tree, especially for selling. They graft it upon a stalk of Artemisia. There is a species of Artemisia that grows wild and covers the waste ground round Pekin; it springs from seed every year, and by the autumn attains to a tree eight to ten feet high, with a stem one and a half inches thick. The Chinese cut it down, and, after drying it, use it as fuel; the small twigs and seeds are twisted into a rope, which is lighted and hung up in a room to smoulder for hours; the pungent smell of the smoke drives out the mosquitoes. This plant, after being potted, is cut down to about three feet, and used as the stock, the twigs of Chrysanthemum are grafted round the top, and it quickly makes a fine tree, the flowers grow and open, and as the stock soon withers the whole tree dies, and folks say, "Another ingenious fraud of the Chinamen." A favorite style of growing Chrysanthemums is in the shape of a fan, with eight or ten flowers in different parts of it. If the flowers are not grown on the plant, they are tied on, which also does for selling. The winters in Pekin are very cold and last about four months, and having no glass houses the Chinese gardeners do not have the chance of producing such a variety or such fine flowers as their European brethren, but in the case of Chrysanthemums they have many curious and beautiful varieties.

M. Charles André, in *Le Journal des Orchidées*, gives an account of his experiences when on a botanical expedition by the shores of the River Amboan, which, though interesting to read when safe at home, gives a good idea of the unexpected dangers often incurred by botanical collectors. M. André was in search of *Cœlogyne asperata* and happened to be in a Dyak hut when the natives were sorting rice preparatory to sowing it. In the evening a noisy procession entered the hut, and the females who were among them laid with much ceremony large bouquets and garlands of the longed-for Orchid on and around the stores of rice. Such was the quantity of the blooms that the perfume was so powerful as to drive the explorer out of the house to spend the night in his boat. He afterward heard that seed-time as well as harvest is an important season to the natives, who are dependent on their crops, and that he had witnessed rejoicings caused by the abundance that year of the *C. asperata* blooms, which were believed to herald an equally fertile harvest. When, some time later, M. André returned to the spot with (among other treasures) a load of the all-important Orchid, he found himself the subject of passionate grief and hatred, and that his only chance of safety was in a generous distribution of money and tobacco and a speedy flight. He had, in the opinion of the Dyaks, committed an act of sacrilege in gathering plants sacred to them, and whose lives they believed were in some way connected with their own.

In "The Resources of Southern Oregon," collected and prepared by the Southern Oregon State Board of Agriculture and recently published at Salem, there is an interesting account of the forests and forest-trees of southern Oregon from the pen of Mr. E. W. Hammond, of Wimer. The forests of southern Oregon are composed chiefly of conifers, containing some of the noblest and most valuable trees known to man, and although these forests do not occupy comparatively a very large area, being confined principally to the Cascade range of mountains, with an average width of about thirty-five miles, and to the coast ranges with an average of about thirty miles, they contain vast quantities of timber. The whole area covered in the state by these two forest-regions Mr. Hammond estimates as 16,000 square miles. "These large forest-areas," he says, "secure an abundant flow of water in the streams both in summer and winter, even in the driest season. Their simply commercial value, if the timber should be cut from them and sent to market, would have been sufficient to have paid the national debt twice over at the highest figures—that is, at $10 per 1,000 feet, the lowest price at the mills of the coast pine and fir lumber, it would amount to $4,000,000,000, for it is estimated by competent judges, after a careful survey of the whole region, that the quantity of the merchantable timber yet standing in the two great forests of the state amounts to no less than 400,000,000,000 of feet." Mr. Hammond's note of warning against the wanton and useless destruction of these forests now going on cannot certainly be too often or too loudly sounded. The welfare of the north-western states depends more upon the preservation of these forests than upon any other one thing.